Issue:
EPA/DOE/TDEC are working at a project team level to develop PRGs and effluent levels for radiological discharges into Bear Creek, per the Administrator's decision. The team is looking for clarification with regards to extrapolating from the in-stream water quality based levels to effluent limits at the end-of-pipe (the point of compliance), and whether a dilution factor can be applied.

The Administrator's 12/31/2020 Decision regarding the discharge to surface water of wastewaters generated during a CERCLA response at the Oak Ridge Reservation

Page 1 establishes that concept that water quality based effluent limits will be set in a way that is similar to the CWA NPDES system.

> "...regulations that establish water quality based effluent limitations under the *Clean Water Act* National Pollutant Discharge Elimination System program as well as Tennessee's NPDES regulations for establishing water quality-based effluent limitations, certain Tennessee Water Quality Standards regulations and certain Nuclear Regulatory Commission regulations for low-level radioactive waste disposal are relevant and appropriate requirements..."

There is no dilution factor in the CWA AWQC formula. Rather, mixing zones or assimilative capacity of receiving body is applied to develop a water quality based effluent limit. The mixing zone or assimilative capacity is calculated where the discharge enters the surface water body, not at a number of kilometers downstream of the discharge.

Page 2 provides for the use of sit- specific information (rather than default exposure assumptions from CWA/NPDES guidance), and sets the risk level at 10^{-5}.

> "The EPA will exercise the flexibility provided in the relevant and appropriate state and federal CWA NPDES regulations and the relevant and appropriate NRC regulations to consider site-specific information to evaluate exposure to radionuclides for the purpose of developing the PRGs for water discharged from CERCLA landfills to waterways at ORR to ensure that risk does not exceed the 10-5 level."

Page 2 states effluent discharge limits should be developed consistent with the CWA.

> "Instead, the DOE will establish PRGs based on site-specific exposure information and will use that information both to develop **CWA effluent discharge limits**..."

"CWA effluent discharge limits" implies the intent to use CWA NPDES methodologies. CWA methodology includes mixing zones or assimilative capacity of the receiving body, at the point of discharge; they do not include a dilution factor accounting for the kilometers of stream between the discharge point and a location convenient for recreational access. DOE's proposed approach does not result in "CWA effluent discharge limits."

Page 4 states that CWA NPDES regulations are relevant and appropriate requirements to the development of PRGs for the on-site discharge to surface waters of radionuclides.

> "...in this case, the EPA and Tennessee's CWA NPDES regulations, as well as Tennessee Water Quality Standards regulations establishing designated uses and criteria to protect those uses, are

relevant and appropriate requirements to the development of PRGs for the on-site discharge to surface waters of radionuclides."

DOE's proposed addition of a dilution factor to PRG equation (and the CWA AWCQ equation) is not in keeping with the CWA NPDES regulations, and is a "customization" of the accepted equation for the convenience of DOE with no basis in CWA NPDES regulations. In the NPDES program, flow rates of receiving bodies compared to the flow rate of effluent are accounted for through assimilative capacity or mixing zones, both of which are applied at the point of discharge. Those methodologies should be applied in this case.

Page 7, again references "...radionuclide effluent concentrations that would be as stringent as the PRGs ***derived through application of CWA NPDES regulations*** *for establishing water quality-based effluent limitations and Tennessee Water Quality Standards regulations...*"

> "The NRC dose-based limit of 25/75/25 mrem/yr for radionuclide releases from a low-level landfill such as the EMDF can be apportioned among the exposure pathways such as air, groundwater, soil, plants, animals and surface water considering fish consumption, and used in combination with the NRC process to reduce radiation dose known as ALARA, to result in radionuclide effluent concentrations that would be as stringent as the PRGs derived through application of CWA NPDES regulations for establishing water quality-based effluent limitations and Tennessee Water Quality Standards regulations, ensuring protectiveness of human health and the environment consistent with CERCLA and the NCP."

Page 9

> "Accordingly, for purposes of establishing PRGs for the discharge of wastewater from ORR landfills, I find that the R4 Regional Administrator properly applied the NCP factors to determine that the Tennessee and the EPA NPDES regulations that pertain to water-quality based effluent limitations and the Tennessee Water Quality Standards regulations establishing designated uses and criteria to protect those uses are relevant and appropriate requirements to the discharge of radionuclides in wastewater from EMWMF and such future discharge from EMDF."

and

> "Water quality criteria also are relevant and appropriate under Section 121(d)(2) because (1) the state has designated Bear Creek for recreation uses; (2) these requirements address discharges into surface water; and (3) their purpose is to protect the designated use of the surface water from risks associated with hazardous substances."

and

> "This decision means that under the relevant and appropriate Tennessee Water Quality Standards established to protect waters designated for "*Recreation Use*" the AWQC for such surface waters must meet a 10-5 target risk level for all carcinogens (including radionuclides) and water quality based effluent limitations must ensure that such AWQC are not exceeded."

These statements imply development of AWQCs for radionuclides using standard methodology, and the effluent limit should be based on the AWQCs (water quality-based effluent limitations).

Page 10: the decision directs the use of site-specific exposure assumptions.

> "I also have determined that the disputed default exposure assumptions, particularly those regarding fish consumption, in CWA guidance documents should not be used to develop PRGs for effluent limits for discharges from ORR landfills."

The decision provides "relief" by directing the use of site-specific exposure assumptions, but otherwise implies the use of CWA NPDES methods.

Page 12: Again, the decision directs use of site-specific exposure assumptions.

> "Instead of using disputed default assumptions regarding exposures, particularly through fish consumption, the DOE, in applying the relevant and appropriate state and federal CWA regulations and NRC regulations, will establish PRGs for effluent discharge limitations based on site-specific exposure information."

Page 13:

> "For the purpose of the FFS, given that the most restrictive use designation for these receiving waters is recreational (including recreational fishing)40 the individual with the potential for reasonable maximum exposure to radionuclides in effluent from ORR landfills would be a recreational fisherman who fishes at a location downstream from the discharge. Radionuclides bioaccumulate so the fact that only small minnows exist at NT-5 does not mean exposure cannot occur.41 The exact location of this point of reasonable maximum exposure will be determined based on where recreational fishing occurs or is reasonably anticipated to occur based on reasonably anticipated future land use, considering the DOE's land use designations."

DOE interprets this to mean that the AWCQ must be met at the point of reasonable maximum exposure – not in the entirety of Bear Creek – and therefore wants to use a dilution factor to account for the flow rate of Bear Creek at the point of reasonable maximum exposure in relation to the flow rate of the effluent. R4 has a different interpretation.

Page 13:

> "Once the PRGs are established applying relevant and appropriate requirements in a manner that considers site-specific risks, they shall be used to derive the specific final effluent limitations... While the point of exposure to radionuclides used for identifying risk and setting appropriate effluent limits may be downstream of the discharge point (which has not yet been determined), the point of compliance for meeting the final effluent limits must be at the point of discharge.(FN 44)"
>
> FN 44: 55 Fed. Reg at 8713 ("For surface waters, the selected levels should be attained at the point or points where the release enters the surface waters.").

<u>This is the statement that DOE relies on to support their interpretation that the water quality level is set at the "fishing hole" and dilution is used to account for the dilution between the effluent and the fishing hole. DOE's interpretation treats Bear Creek, to the point of the fishing hole, as a pipe. R4 disagrees with DOE's interpretation.</u>

Project Team activities:

To develop instream PRGs and effluent levels for radionuclides, the project team will:

1. Select a stretch of Bear Creek that could reasonably be fished (recreation). Per the decision, this point may be downstream from the effluent outfall. *Parties agree.*
2. Using PRG calculator, develop in-stream PRGs for each radionuclide, using the site-specific fish consumption inputs rather than default consumption inputs. *Parties agree*.
3. To develop the site-specific consumption inputs, use available literature and conduct a fish survey at a place that could reasonably be fished. From that information and data, develop agreed upon consumption rates/frequency.

4. Extrapolating from in-stream PRG to effluent limit – *Parties do NOT agree*.
    a. Using the resulting PRGs, DOE/UCOR intends to apply a dilution factor to account for the flow rate of the place fishing may occur verses the discharge point. (Median flow rate at fishing location.)
    b. R4 is not in agreement application of dilution factor to the PRG. It is our understanding that the decision instructs us to develop an in-stream PRG for recreational fishing, and that this number is applied to the point of compliance (effluent end-of-pipe), with no dilution factor. [Assimilative capacity of the receiving water body can be used at the point the pipe enters the water. Further, assimilate capacity should be based on critical flow conditions (30Q5), or otherwise consistent with the CWA concept of assimilative capacity or mixing zone.] R4 is seeking guidance on interpreting the decision.

R4 view:

a) The discharge limit should be protective of the entire creek, not limited to the area most-likely to be fished.
b) The "relief" given by the decision is that, rather than using CWA default parameters for fish consumption and duration, a site-specific consumption rate and the CERCLA risk assessment duration can be used. The site-specific consumption rate is determined based on a place in Bear Creek that can be reasonably expected to support recreational fishing. The resulting PRGs are in-stream goals that would be applied throughout the stream – a CWA concept analogous to an AWQC for a chemical). Per the decision, the in-stream PRG (developed using site-specific exposure parameters) is to be applied at the point of compliance (i.e. end-of-pipe).
c) The CWA AWQC and the PRG calculator use the same equation to develop instream water concentrations. Neither equation includes a dilution factor. The instream water quality number, whether developed using the PRG calculator tool or using the CWA AWQC formula, is calculated the same way. In this case, site-specific exposure inputs can be used rather than the CWA guidance defaults. Further, per the decision, the instream goal is set at a 10E-5 risk level.
d) Once the instream # is developed, the effluent level is developed. At this point, the assimilative capacity of the receiving water body is applied to account for the size of the receiving body at the point of effluent discharge (end of pipe). Assimilative capacity is determined by CWA methodology using a 30Q5 critical stream flow. (Can a mixing zone be used?)
e) For the EMWMF, NT-5 (north tributary 5) has no assimilative capacity. However, in theory, <u>if</u> the effluent were piped to a higher flow part of Bear Creek, there would be some assimilative capacity.